

420-TP-016-001

**Backus-Naur Format (BNF)
Representation of the B.0 Earth Science
Data Model for the ECS Project**

**Technical Paper--Not intended for formal review or
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Abstract

This technical paper describes the convention and the Backus-Naur Format (BNF) representation of the B.0 Earth Science Data Model (420-TP-015-001). This technical paper represents modifications to the Release B Data Model published in July 1996 (311-CD-008-001).

Keywords: BNF, Metadata, Data, Model, Database, Design, Specification, Dictionary, Attributes, Class

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1. Introduction

1.1 Purpose

The purpose of this technical document is to provide modifications to Appendix B from the Release B SDPS Database Design and Database Schema Specification (311-CD-008-001). This technical document provides a Backus-Naur Format (BNF) representation of the B.0 Earth Science Data Model (420-TP-015-001).

1.2 Organization

This paper is organized in accordance with ESDIS standard format. A description of the document content follows:

- Section 2 contains the Backus-Naur Format (BNF) representation of the B.0 Earth Science Data Model.

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2. BNF Representation of the B.0 Earth Science Data Model

2.1 Introduction

This paper describes the convention and representation of the ECS B.0 Earth Science Data Model (420-TP-015-001) using Backus-Naur Format. Three BNF representation of the B.0 data model are presented based on the product categories defined by the Data Model Working Group (DMWG) meeting in the summer of 1995; those having full, intermediate and limited requirements for services. This is done in recognition of the fact that to demand a full set of attributes for all data collections in ECS is unnecessary and possibly very costly for migrated data sets. Equally, to make all or most attributes optional would allow the possibility of having valuable data set not fully described and therefore inadequately documented and serviced.

The categories of data product in relation to the amount of level of metadata support required are defined as follows:

Full level of metadata is required for products generated within EOSDIS.

Intermediate level of metadata is required for products generated outside of EOSDIS but used within EOSDIS (ancillary, level 0, campaign, LandSat 7, TRMM). It could also be applied to V0 data sets migrated to ECS (especially those reformatted to HDF-EOS) as well as special products.

Limited level of metadata is applied to all other products (e.g. low priority V0 data sets migrated with no format or other change). Relatively few products are likely to fall into this category. Advertisers of external products should meet only these minimum requirements.

The approach to specifying which individual attributes should be mandatory is to have the standard list of all 'core' attributes for all 3 categories but changing the status of attributes for each class of product. The status of each attribute may be mandatory or optional; and attribute status is progressively tightened from limited to full. This means that, for example, a collection in the 'limited' class can have all metadata - but it need have only a bare minimum.

Inputs to the decision of the status of attributes comes from four sources:

- a. The status of GCMD/DIF attributes (where used).
- b. The status of FGDC attributes (where used).
- c. The need to provide attributes which support certain services.
- d. Engineering judgment as to the suitability of attribute within each class.

The major service is the sophistication of the search and the amount of supporting metadata which can be retrieved. However, two other services are significant:

- a. Subset/subsample/display of products requires structural metadata plus map projection information. This will be held in the HDF-EOS specific metadata areas which are not a part of the core metadata. There will be no further references to these services in this appendix.
- b. Navigation from displayed granules to related data objects require the maintenance of links in the metadata to these objects..

2.2 Interpretation of Information

2.2.1 Introduction

The notation used in the body of this paper is Backus Naur Form (BNF). Section 2.2.2 describes how to read it. The BNF usage is taken directly from the FGDC standard in terms both of the syntax and, where FGDC attributes are used, the production rules themselves for attribute selection.

The classes in **bold**, both in the summary tables (section 2.3.0) and in the BNF (sections 2.4.0, 2.5.0 and 2.6.0) indicate compound definitions which are decomposed in the compound definitions (section 2.6.0).

All attributes ending with the term ...Pointer implies a data object further specified in Appendix A (311-CD-008-001) rather than an individual attribute. The data producer has responsibility in most cases to produce the content of the instance of the data object pointed to. Pointers themselves provide navigation out of the database to the archived data objects.

2.2.2 Explanation of BNF

Production Rules

A production rule specifies the relationship between a compound element, and data elements and other (lower-level) compound elements. Each production rule has a left side (identifier) and a right side (expression) connected by the symbol “=”, meaning that the term on the left side is replaced by or produces the term on the right side. Terms on the right side are either other compound elements or individual data elements. By making substitutions using matching terms in the production rules, one can explain higher-level concepts using data elements.

The symbols used in the production rules have the following meaning:

<u>Symbol</u>	<u>Meaning</u>
=	is replaced by, produces, consists of
+	and
[]	exclusive OR , select exactly one term from the list of enclosed terms . Terms are separated by “ ”.
m{ }n	iteration - the term(s) enclosed is(are) repeated from “m” to “n” times.
()	optional - the attribute(s) enclosed is(are) optional

Examples:

- a=b+c “a consists of b and c”
- a=[b|c] “a consists of one of b or c”
- a=4{b}6 “a consists of four to six occurrences of b”
- a=b+(c) “a consists of b and optionally c”

Interpreting the production rules:

The terms bounded by parentheses, “(“ and “)”, are optional and are provided at the discretion of the data producer. If a producer chooses to provide information enclosed by

parentheses, the producer shall follow the production rules for the enclosed information. For example, if the producer decides to provide the optional information described in the term:

(a+b+c) the producer shall provide a and b and c.

Only for terms bounded by parentheses does the producer have the discretion of deciding whether or not to provide the information.

2.2.3 BNF Mapping to OMT Nomenclature

Since BNF is inherently a “flat” data representation language and does not include notation for depicting associations between object classes the following convention was developed to allow mapping between OMT and BNF.

Table 2-1. BNF Mapping to OMT Nomenclature

OMT Notation	BNF Convention	Comment
ClassName	ClassName	Class names in bold type.
AttributeName	AttributeName	Attributes in normal type.
Generalization (triangle)	[A B] (logical OR)	
Aggregation	+	Assembly class = Subclass 1 + Subclass 2
Association:	0{IndependentClass + 0{DependentClass}n} n	Nesting of Dependent objects.

2.3 Summary Tables

This section presents a summary of all ECS core attributes sorted by class. The columns include the Class name, the Attribute name, attribute level; Single Type or Multitype Collection, or Granule, and DMWG optionality level (Full, Intermediate and Limed). **Collection-level** attributes characterize all the granules in a collection and do not vary on a granule basis. An example is the attribute ArchiveCenter which contains a single value for all granules in a collection. **Granule-level** attributes may vary on a granule basis. An example is the attribute SizeMBECSDataGranule. Some attributes are associated with both collections and individual granules in a collection. When associated with a granule these attributes characterize the single granule and when associated with a collection they characterize all the granules in that collection. An example is the attribute PlatformShortName. A single granule can be associated with zero or more Platforms (e.g. NOAA 7, 8) while an adjacent granule can be associated with a different subset of Platforms (e.g. NOAA 8, 9). The collection then would be associated with the superset (e.g. NOAA 7, 8, 9).

It should be noted that this table summarizes only the optionality of **attributes** within object classes. The optionality of the object classes themselves are denoted on the OMT diagrams and using the BNF notation. The convention used in this paper is that if any attributes within an object class are deemed mandatory then the class itself must be mandatory. Conversely, not all attributes within a mandatory class must be mandatory.

Readers are advised to examine sections 2.4.0 and 2.5.0 carefully to understand the summary tables (Table 2-2) since significant points are not clearly demonstrated in the summary tables.

The following definitions apply to Table 2-2.

(STC = Single Type Collection, MTC = Multiple Type Collection, Gran = Granule, F = Full, I = Intermediate, L = Limited).

Note 1 - M or O in the last three columns apply only to prior columns denoted with an "X".

Note 2 - Granule-level attributes identified with an asterisk * are used to reference the attribute to a specific collection.

Table 2-2. Summary Status of B.0 Core Attributes (1 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
AdditionalAttributes	AdditionalAttributeDatatype	X	X		O	O	O
AdditionalAttributes	AdditionalAttributeDescription	X	X		O	O	O
AdditionalAttributes	AdditionalAttributeName	X	X	X*	O	O	O
AlgorithmDescription	DescriptionType	X			M	O	O
AltitudeResolutionClass	AltitudeResolution	X	X		O	O	O
AltitudeSystemDefinition	AltitudeEncodingMethod	X	X		O	O	O
AltitudeSystemDefinition	AltitudeDistanceUnits	X	X		O	O	O
AltitudeSystemDefinition	AltitudeDatumName	X	X		O	O	O
AnalysisSource	AnalysisTechnique	X	X		O	O	O
AnalysisSource	AnalysisType	X	X		O	O	O
AnalysisSource	AnalysisShortName	X	X	X	O	O	O
AnalysisSource	AnalysisLongName	X	X		O	O	O
AnalysisSourceGuide	AnalysisSourceGuidePointer	X	X		O	O	O
AncillaryInputGranule	AncillaryInputType			X	O	O	O
AncillaryInputGranule	AncillaryInputPointer			X	O	O	O
ArchiveCenterGuide	ArchiveCenterGuidePointer	X	X		O	O	O
ATBD	ATBDPointer	X			M	O	O
Author	AuthorName	X	X		O	O	O
Author	AuthorAffiliation	X	X		O	O	O
BoundingRectangle	NorthBoundingCoordinate	X	X	X	M	M	O
BoundingRectangle	SouthBoundingCoordinate	X	X	X	M	M	O
BoundingRectangle	WestBoundingCoordinate	X	X	X	M	M	O
BoundingRectangle	EastBoundingCoordinate	X	X	X	M	M	O
Browse	BrowseDescription	X	X		O	O	O
Browse	BrowsePointer	X	X	X	O	O	O
Browse	BrowseSize	X	X		O	O	O
CalibrationFiles	CalibrationFilesPointer	X			O	O	O
Campaign	CampaignEndDate	X	X		O	O	O
Campaign	CampaignStartDate	X	X		O	O	O
Campaign	CampaignShortName	X	X	X	O	O	O

Table 2-2. Summary Status of B.0 Core Attributes (2 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
Campaign	CampaignLongName	X	X		O	O	O
CampaignGuide	CampaignGuidePointer	X	X		O	O	O
ChangeLog	ChangeLogPointer	X			O	O	O
Circle	RadiusValue			X	O	O	O
Circle	RadiusUnits			X	O	O	O
Circle	CenterLongitude			X	O	O	O
Circle	CenterLatitude			X	O	O	O
CollectionAssociation	CollectionUse	X	X		O	O	O
CollectionAssociation	CollectionType	X	X		O	O	O
CollectionDescriptionClass	LongName	X O	X O		M	M	M
CollectionDescriptionClass	ShortName	X	X	X*	M	M	M M
CollectionDescriptionClass	VersionID	X O	X O	X*	M	M	M M
CollectionDescriptionClass	CollectionDescription	X O	X O		M	M	M
CompileInfo	CompileInfoPointer	X			M	O	O
Contact	Role	X	X		M	M	M
Contact	ContactInstructions	X	X		O	O	O
Contact	HoursofService	X	X		O	O	O
ContactAddress	StreetAddress	X	X		O	O	O
ContactAddress	City	X	X		O	O	O
ContactAddress	Country	X	X		O	O	O
ContactAddress	PostalCode	X	X		O	O	O
ContactAddress	StateProvince	X	X		O	O	O
ContactOrganization	ContactOrganizationName	X	X		M	M	M
ContactPerson	ContactMiddleName	X	X		M	M	M
ContactPerson	ContactFirstName	X	X		M	M	M
ContactPerson	ContactJobPosition	X	X		O	O	O
ContactPerson	ContactLastName	X	X		M	M	M
ContextDiagrams	ContextDiagramsPointer	X			O	O	O
CoordinateRepresentation	OrdinateResolution	X	X		O	O	O
CoordinateRepresentation	AbscissaResolution	X	X		O	O	O
CSDTDescription	PrimaryCSDT	X			O	O	O
CSDTDescription	IndirectReference	X			O	O	O
CSDTDescription	Implementation	X			O	O	O
CSDTDescription	CSDTComments	X			O	O	O

Table 2-2. Summary Status of B.0 Core Attributes (3 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
DeliveredAlgorithmPackage	AlgorithmPackageName	X			M	O	O
DeliveredAlgorithmPackage	DeliveryPurpose	X			M	O	O
DeliveredAlgorithmPackage	AlgorithmPackageVersion	X			M	O	O
DeliveredAlgorithmPackage	AlgorithmPackageAcceptanceDate	X			M	O	O
DeliveredAlgorithmPackage	AlgorithmPackageMaturityCode	X			M	O	O
DeliveryContentsList	DeliveryContentsListPointer	X			M	O	O
DepthResolutionClass	DepthResolution	X	X		O	O	O
DepthSystemDefinition	DepthEncodingMethod	X	X		O	O	O
DepthSystemDefinition	DepthDistanceUnits	X	X		O	O	O
DepthSystemDefinition	DepthDatumName	X	X		O	O	O
DetailedDesign	DetailedDesignPointer	X			O	O	O
DistanceandBearingRepresentation	BearingReferenceDirection	X	X		O	O	O
DistanceandBearingRepresentation	BearingReferenceMeridian	X	X		O	O	O
DistanceandBearingRepresentation	BearingResolution	X	X		O	O	O
DistanceandBearingRepresentation	DistanceResolution	X	X		O	O	O
DistanceandBearingRepresentation	BearingUnits	X	X		O	O	O
Document	DocumentCreated	X	X		M	M	O
Document	Title	X	X		M	M	O
Document	DocumentUpdated	X	X		M	M	O
Document	DocumentVersion	X	X		M	M	O
ECSCollection	ProcessingCenter	X	X		M	O	O
ECSCollection	RevisionDate	X	X		O	O	O
ECSCollection	SuggestedUsage	X	X		O	O	O
ECSCollection	ArchiveCenter	X	X		M	M	M
ECSCollectionGuide	ECSCollectionGuidePointer	X	X		O	O	O
ECSDataGranule	GranulePointer			X	M	M	O
ECSDataGranule	LocalVersionID			X	O	O	O
ECSDataGranule	ProductionDateTime			X	O	O	O
ECSDataGranule	DayNightFlag			X	O	O	O
ECSDataGranule	SizeMBECSDataGranule			X	M	M	O
ECSDataGranule	ReprocessingPlanned			X	M	O	O
ECSDataGranule	ReprocessingActual			X	M	O	O
ECSDataGranule	LocalGranuleID			X	O	O	O
ECSDiscipline	ECSDisciplineKeyword	X	X		M	M	M

Table 2-2. Summary Status of B.0 Core Attributes (4 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
ECSParameter	ECSParameterKeyword	X	X		O	O	O
ECSTerm	ECSTermKeyword	X	X		M	M	O
ECSTopic	ECSTopicKeyword	X	X		M	M	M
ECSVariable	ECSVariableKeyword	X	X		M	M	O
Email	ElectronicEmailAddress	X	X		O	O	O
ExternalData	ExternalDataPointer	X			O	O	O
GeodeticModel	HorizontalDatumName	X	X		O	O	O
GeodeticModel	EllipsoidName	X	X		O	O	O
GeodeticModel	DenominatorofFlatteningRatio	X	X		O	O	O
GeodeticModel	SemiMajorAxis	X	X		O	O	O
GeographicCoordinateSystem	GeographicCoordinateUnits	X	X		O	O	O
GeographicCoordinateSystem	LongitudeResolution	X	X		O	O	O
GeographicCoordinateSystem	LatitudeResolution	X	X		O	O	O
GranuleLocality	LocalityValue			X	O	O	O
GridCoordinateSystem	GridCoordinateSystemName	X	X		O	O	O
GRing	ExclusionGRingFlag	X	X	X	M	M	O
GRingPoint	GRingPointSequenceNo	X	X	X	M	M	O
GRingPoint	GRingPointLongitude	X	X	X	M	M	O
GRingPoint	GRingPointLatitude	X	X	X	M	M	O
Guide	GuideName	X	X		M	M	O
Guide	DataCenter	X	X		M	M	O
InformationContent	ParameterValue	X	X	X	O	O	O
InputGranule	InputPointer			X	M	O	O
Instrument	NumberofSensors	X	X		O	O	O
Instrument	InstrumentTechnique	X	X		O	O	O
Instrument	InstrumentShortName	X	X	X	O	O	O
Instrument	InstrumentLongName	X	X		O	O	O
InstrumentCharacteristicValue Class	InstrumentCharacteristicValue	X	X		O	O	O
InstrumentCharacteristic	InstrumentCharacteristicUnit	X	X		O	O	O
InstrumentCharacteristic	InstrumentCharacteristicName	X	X		O	O	O
InstrumentCharacteristic	InstrumentCharacteristicDescription	X	X		O	O	O
InstrumentCharacteristic	InstrumentCharacteristicDataType	X	X		O	O	O
InstrumentEngineeringData	InstrumentEngineeringDataPointer	X			O	O	O
InstrumentGuide	InstrumentGuidePointer	X	X		O	O	O
InstrumentScienceData	InstrumentScienceDataPointer	X			M	O	O

Table 2-2. Summary Status of B.0 Core Attributes (5 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
JournalArticle	JournalArticlePointer	X	X		M	O	O
JournalArticle	JournalArticleName	X	X		M	O	O
KeywordClass	SpatialKeyword	X	X		M	M	O
KeywordClass	TemporalKeyword	X	X		M	M	O
LinkandCompileScripts	LinkandCompileScriptsPointer	X			M	O	O
LocalCoordinateSystem	LocalGeoreferenceInformation	X	X		O	O	O
LocalCoordinateSystem	LocalCoordinateSystemDescription	X	X		O	O	O
Locality	LocalityDescription	X	X		O	O	O
Locality	LocalityType	X	X		O	O	O
LocalPlanarCoordinateSystem	LocalPlanarCoordinateSystemDescription	X	X		O	O	O
LocalPlanarCoordinateSystem	LocalPlanarGeoreferenceInformation	X	X		O	O	O
MapProjection	MapProjectionPointer	X	X		O	O	O
MapProjection	MapProjectionName	X	X		O	O	O
MetadataConfigurationFile	MetadataConfigurationFilePointer	X			M	O	O
MultipleDateTimePeriod	MultipleDateName	X	X		O	O	O
MultipleTypeCollection	AggregationRelationship		X		M	M	M
MultipleTypeCollection	AggregationValue		X		M	M	M
MultipleTypeCollection	AggregationType		X		M	M	M
OperationModeClass	OperationMode	X	X	X	O	O	O
OperationsManual	OperationManualPointer	X			O	O	O
OrbitCalculatedSpatialDomain	EquatorCrossingLongitude			X	O	O	O
OrbitCalculatedSpatialDomain	OrbitNumber			X	O	O	O
OrbitCalculatedSpatialDomain	EquatorCrossingDate			X	O	O	O
OrbitCalculatedSpatialDomain	EquatorCrossingTime			X	O	O	O
OrbitCalculatedSpatialDomain	OrbitalModelName			X	O	O	O
OrbitCalculatedSpatialDomain	StartOrbitNumber			X	O	O	O
OrbitCalculatedSpatialDomain	StopOrbitNumber			X	O	O	O
OrbitParametersGranule	OrbitParametersPointer			X	O	O	O
PerformanceTestResults	PerformanceTestResultsPointer	X			O	O	O
PGEConfigFilePointer	PGEConfigFilePointer	X			M	O	O
PGEDescription	PGEName	X		X	M	O	O
PGEDescription	PGEFunction	X			M	O	O
PGEErrorLog	PGEErrorLogPointer	X			O	O	O
PGEExecutable	ScSWExecutablesPointer	X			M	O	O
PGEExecutable	PGEIdentifier	X			M	O	O

Table 2-2. Summary Status of B.0 Core Attributes (6 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
PGEInfo	DateLastModified	X			M	O	O
PGEInfo	ReceivedAlgorithmPackagePointer	X			M	O	O
PGEVersionClass	PGEVersion	X		X	M	O	O
PhysicalParameterDetails	ParameterRange	X	X		O	O	O
PhysicalParameterDetails	ParameterUnitsofMeasurement	X	X		O	O	O
PhysicalParameterDetails	ParameterValueAccuracyExplanation	X	X		O	O	O
PhysicalParameterDetails	ParameterValueAccuracy	X	X		O	O	O
PhysicalParameterDetails	ParameterMeasurementResolution	X	X		O	O	O
PlanarCoordinateInformation	PlanarDistanceUnits	X	X		O	O	O
PlanarCoordinateSystem	PlanarCoordinateEncodingMethod	X	X		O	O	O
Platform	PlatformType	X	X		O	O	O
Platform	PlatformLongName	X	X		O	O	O
Platform	PlatformShortName	X	X	X	O	O	O
PlatformAncillaryData	PlatformAncillaryDataPointer	X			O	O	O
PlatformCharacteristic	PlatformCharacteristicDescription	X	X		O	O	O
PlatformCharacteristic	PlatformCharacteristicDataType	X	X		O	O	O
PlatformCharacteristic	PlatformCharacteristicName	X	X		O	O	O
PlatformCharacteristicValueClass	PlatformCharacteristicValue	X	X		O	O	O
PlatformCharacteristic	PlatformCharacteristicUnit	X	X		O	O	O
PlatformGuide	PlatformGuidePointer	X	X		O	O	O
Point	PointLongitude			X	O	O	O
Point	PointLatitude			X	O	O	O
ProcessControlParametersandResourceFiles	ProcessControlParametersandResourceFilesPointer	X			M	O	O
ProcessingCenterGuide	ProcessingCenterGuidePointer	X	X		O	O	O
ProcessingDependencies	ProcessingDependenciesPointer	X			M	O	O
ProcessingErrorReport	ProcessingErrorReportPointer	X			O	O	O
ProcessingFileDescription	ProcessingFileDescriptionPointer	X			O	O	O
ProcessingHistory	ProcessingHistoryPointer			X	M	O	O
ProcessingLevel	ProcessingLevelDescription	X			M	O	O
ProcessingLevel	ProcessingLevelID	X			M	O	O
ProcessingQA	ProcessingQADescription			X	O	O	O
ProcessingQA	ProcessingQAAttribute			X	O	O	O
ProcessingReport	ProcessingReportType	X	X		O	O	O
ProcessingReport	ProcessingReportPeriod	X	X		O	O	O

Table 2-2. Summary Status of B.0 Core Attributes (7 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
ProcessingResourceUsageReport	ProcessingResourceUsageReportPointer	X	X		O	O	O
ProcessingStatusReport	ProcessingStatusReportPointer	X	X		O	O	O
ProductionPlan	ProductionPlanForecast	X	X		O	O	O
ProductionPlan	ProductionPlanEndDate	X	X		O	O	O
ProductionPlan	ProductionPlanStartDate	X	X		O	O	O
ProductionPlan	ProductionPlanDescription	X	X		O	O	O
ProductionPlan	ProductionPlanPointer	X	X		O	O	O
ProductionPlan	PlannedDataSets	X	X		O	O	O
ProductionPlan	DAACName	X	X		O	O	O
ProgrammersGuide	ProgrammersGuidePointer	X			O	O	O
QAFlags	AutomaticQualityFlag			X	M	O	O
QAFlags	OperationalQualityFlag			X	M	O	O
QAFlags	QualityFlagExplanation			X	M	O	O
QAFlags	ScienceQualityFlag			X	M	O	O
QAGranule	QAGranulePointer			X	O	O	O
QAStats	QAPercentInterpolatedData			X	O	O	O
QAStats	QAPercentMissingData			X	M	O	O
QAStats	QAPercentOutofBoundsData			X	O	O	O
QAStats	QAPercentCloudCover			X	O	O	O
QualityTextComment	QualityTextCommentPointer	X	X		O	O	O
RangeDateTime	RangeEndingDate	X	X	X	M	M	O
RangeDateTime	RangeBeginningTime	X	X	X	M	M	O
RangeDateTime	RangeBeginningDate	X	X	X	M	M	O
RangeDateTime	RangeEndingTime	X	X	X	M	M	O
ReferencePaper	AbstractPointer	X	X		M	O	O
ReferencePaper	ReferencePaperType	X	X		M	O	O
ReferencePaper	ReferencePaperReference	X	X		M	O	O
ReferencePaper	DateofReferencePaperPublication	X	X		M	O	O
ReferencePaper	AccessInstructions	X	X		M	O	O
RegionalAreaDefinitionGuide	GeographicalRegionName	X	X		O	O	O
RegionalAreaDefinitionGuide	RegionalAreaDefinitionGuidePointer	X	X		O	O	O
RegularPeriodic	PeriodDurationUnit	X	X		O	O	O
RegularPeriodic	Period1stDate	X	X		O	O	O
RegularPeriodic	PeriodName	X	X		O	O	O
RegularPeriodic	PeriodCycleDurationUnit	X	X		O	O	O
RegularPeriodic	Period1stTime	X	X		O	O	O

Table 2-2. Summary Status of B.0 Core Attributes (8 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
RegularPeriodic	PeriodCycleDurationValue	X	X		O	O	O
RegularPeriodic	PeriodDurationValue	X	X		O	O	O
ResultsProductFile	ResultsProductFilePointer	X			O	O	O
ResultsReport	ResultsReportPointer	X			O	O	O
Review	ScienceReviewDate	X		X	O	O	O
Review	ScienceReviewStatus	X		X	O	O	O
Review	FutureReviewDate	X		X	O	O	O
ScSWScript	ScSWScriptPointer	X			O	O	O
ScSWSOURCECODE	ScSWSOURCECODEPointer	X			M	O	O
Sensor	SensorShortName	X	X	X*	O	O	O
Sensor	SensorLongName	X	X		O	O	O
Sensor	SensorTechnique	X	X		O	O	O
SensorCharacteristic	SensorCharacteristicName	X	X	X	O	O	O
SensorCharacteristicValueClass	SensorCharacteristicValue	X	X	X	O	O	O
SensorCharacteristic	SensorCharacteristicDescription	X	X		O	O	O
SensorCharacteristic	SensorCharacteristicDataType	X	X		O	O	O
SensorCharacteristic	SensorCharacteristicUnit	X	X		O	O	O
SensorGuide	SensorGuidePointer	X	X		O	O	O
SingleDateTime	CalendarDate			X	M	M	O
SingleDateTime	TimeOfDay			X	M	M	O
SingleTypeCollection	AccessConstraints	X			O	O	O
SingleTypeCollection	CitationforExternalPublication	X			O	O	O
SingleTypeCollection	MaintenanceandUpdateFrequency	X			M	M	O
SingleTypeCollection	CollectionState	X			M	M	O
Software	SWDateLastModified	X			M	O	O
Spatial	SpatialCoverageType	X	X		O	O	O
StandAloneDocumentPointer	StandAloneDocumentPointer	X	X		M	O	O
StorageMediumClass	StorageMedium	X	X	X	O	O	O
SWDevelopmentStandard	SWDevelopmentStandardPointer	X			O	O	O
SystemDescription	SystemDescriptionPointer	X			O	O	O
Telephone	TelephoneNumber	X	X		O	O	O
Telephone	TelephoneNumberType	X	X		O	O	O
Temporal	PrecisionofSeconds	X	X		M	M	O
Temporal	EndsatPresentFlag	X	X		M	M	O
Temporal	TimeType	X	X		M	M	O
Temporal	TemporalRangeType	X	X		M	M	O

Table 2-2. Summary Status of B.0 Core Attributes (9 of 9)

CLASS	ATTRIBUTE	STC	MTC	GRAN	F	I	L
Temporal	DateType	X	X		M	M	O
TestPlan	TestPlanPointer	X			O	O	O
TestScript	TestScriptPointer	X			M	O	O
TestSiteConfig	TestSiteConfigPointer	X			O	O	O
TestSourceCode	TestSourceCodePointer	X			M	O	O
UserCommentDocument	UserCommentDocumentPointer	X	X	X	O	O	O
ValidationDocument	ValidationDocumentPointer	X	X		O	O	O
VerticalSpatialDomain	VerticalSpatialDomainValue			X	O	O	O
VerticalSpatialDomain	VerticalSpatialDomainType			X	O	O	O
ZoneIdentifierClass	ZoneIdentifier	X	X	X	O	O	O

2.4 Collection Level Metadata Specification

The following defines the production rules for the population of the ECS metadata for collections deemed to require limited, intermediate and full metadata content.

2.4.1 Metadata Requirement for Collections in Limited Class

The intent is to provide minimum cataloging of collections while maintaining a reasonable level of service. The ‘skinny DIF’ is used as a baseline for mandatory attributes to which is added limited time and space measures.

SingleType Collection (Limited)=

```
1{CollectionDescriptionClass}1 +
1{ECSCollection}1+
1>Contact +
  0{Email}n+
  0{ContactAddress}n+
  0{Telephone}n}n+
1{ECSDiscipline+
  1{ECSTopic}1+
  1{ECSTerm}1+
  0{ECSVariable}1
  0{ECSParameter}1}n+
0{SingleTypeCollection}+
0{Spatial}1+
0{Temporal +
  0{RegularPeriodic}n+
  0{MultipleDateTimePeriod}n+
  0{[SingleDateTime|RangeDateTime]}1}1+
0{KeywordClass}n+
0{Document}n+
0{DeliveredAlgorithmPackage}1+
0{ProcessingLevel}1+
0{AnalysisSource}n+
0{Campaign}n+
0{Locality}n+
0{Platform +
  0{PlatformCharacteristic+PlatformCharacteristicValueClass}n+
  0{Instrument} +
```

0{OperationModeClass}n+
0{InstrumentCharacteristic+InstrumentCharacteristicValueClass}n+
**0{Sensor +0{SensorCharacteristic
+SensorCharacteristicValueClass}n}n}n+**
0{CollectionAssociation}n+
0{Browse}n+
0{Review}n+
0{CSDTDescription}1+
0{AdditionalAttributes +
0{PhysicalParameterDetails}1+
1{InformationContent}1 }n+
0{QualityTextComment}1+
0{ValidationDocument}1+
0{UserCommentDocument}1+
0{StorageMediumClass}n

2.4.2 Metadata Requirement for Collections in Intermediate Class

The aim here is to provide substantial cataloging of collections (especially when taken with intermediate granule level attributes) and a full set of services. The DIF is used as a baseline for mandatory attributes.

Single Type Collection (Intermediate) =

```
1{CollectionDescriptionClass}1 +
1{ECSCollection}1+
1{SingleTypeCollection}1+
1{Temporal} +
  0{RegularPeriodic}n+
  0{MultipleDateTimePeriod}n+
  0{[SingleDateTime|RangeDateTime]}1}1+
1{Contact} +
  0{Email}n+
  0{ContactAddress}n+
  0{Telephone}n}n+
1{ECSDiscipline}+
  1{ECSTopic}1+
  1{ECSTerm}1+
  1{ECSVariable}1
  0{ECSParameter}1}n+
1{KeywordClass}n+
1{Guide+1{Document}}1}n+
0{Spatial}1+
0{Platform} +
  0{PlatformCharacteristic+PlatformCharacteristicValueClass}n+
  0{Instrument} +
  0{OperationModeClass}n+
  0{InstrumentCharacteristic+InstrumentCharacteristicValueClass}n+
  0{Sensor} +
  0{SensorCharacteristic+SensorCharacteristicValueClass}n}n}n}n+
0{DeliveredAlgorithmPackage}1+
0{ProcessingLevel}1+
0{AnalysisSource}n+
0{Campaign}n+
```

0{Locality}n+
0{CollectionAssociation}n+
0{Browse}n+
0{Review}n+
0{CSDTDescription}1+
0{AdditionalAttributes} +
 0{PhysicalParameterDetails}1+
 1{InformationContent}1 }n+
0{QualityTextComment}1+
0{ValidationDocument}1+
0{UserCommentDocument}1+
0{StorageMediumClass}n

2.4.3 Metadata Requirement for Collections in Full Class

The aim here is to provide maximum cataloging of collections (especially when taken with full granule level attributes) and a comprehensive set of services. All attributes applicable at the collection level from the core set are used.

Single Type Collection (Full) =

```
1{CollectionDescriptionClass}1 +
1{ECSCollection}1+
1{SingleTypeCollection}+
1{Spatial}1+
1{Temporal} +
  0{RegularPeriodic}n+
  0{MultipleDateTimePeriod}n+
  1{[SingleDateTime|RangeDateTime]1}1+
1{Contact} +
  0{Email}n+
  0{ContactAddress}n+
  0{Telephone}n}n+
1{ECSDiscipline}+
  1{ECSTopic}1+
  1{ECSTerm}1+
  1{ECSVariable}1
  0{ECSParameter}1}n+
1{KeywordClass}n+
1{Guide}+1{Document}1}n+
1{DeliveredAlgorithmPackage}1+
1{ProcessingLevel}1+
0{Platform} +
  0{PlatformCharacteristic+PlatformCharacteristicValueClass}n+
  0{Instrument} +
  0{OperationModeClass}n+
  0{InstrumentCharacteristic+InstrumentCharacteristicValueClass}n+
  0{Sensor} +
  0{SensorCharacteristic+SensorCharacteristicValueClass}n}n}n}n+
0{AnalysisSource}n+
0{Campaign}n+
```

0{Locality}n+
0{CollectionAssociation}n+
0{Browse}n+
0{Review}n+
0{CSDTDescription}1+
0{AdditionalAttributes} +
 0{PhysicalParameterDetails}1+
 1{InformationContent}1 }n+
0{QualityTextComment}1+
0{ValidationDocument}1+
0{UserCommentDocument}1+
0{StorageMediumClass}n

2.4.4 MultiType Collections

Multitype collections are “virtual” collections and reference granules, single type collections and multitype collections. Multitype collections are associated with all the same classes as SingleTypeCollections with the exception of Review, ProcessingLevel, CSDTDescription and DeliveredAlgorithmPackage.

Multiple Type Collection =

```
1{MultipleTypeCollection}1+
1{CollectionDescriptionClass}1 +
1{ECSCollection}1+
1>Contact +
  0{Email}n+
  0{ContactAddress}n+
  0{Telephone}n}n+
1{ECSDiscipline+
  1{ECSTopic}1+
  1{ECSTerm}1+
  1{ECSVariable}1
  0{ECSParameter}1}n+
1{KeywordClass}n+
1{Guide+1{Document}1}n+
0{Spatial}1+
1{Temporal +
  0{RegularPeriodic}n+
  0{MultipleDateTimePeriod}n+
  1{[SingleDateTime|RangeDateTime]}1}1+
0{AnalysisSource}n+
0{Campaign}n+
0{Locality}n+
0{Platform +
  0{PlatformCharacteristic+PlatformCharacteristicValueClass}n+
  0{Instrument +
    0{OperationModeClass}n+
    0{InstrumentCharacteristic+InstrumentCharacteristicValueClass}n+
    0{Sensor +
      0{SensorCharacteristic+SensorCharacteristicValueClass}n}n}n+
  0{CollectionAssociation}n+
```

0{Browse}n+
0{AdditionalAttributes +
 0{PhysicalParameterDetails}1+
 1{InformationContent}1 }n+
 0{QualityTextComment}1+
 0{ValidationDocument}1+
 0{UserCommentDocument}1+
0{StorageMediumClass}n

2.5 Granule Level Metadata

2.5.1 Metadata Requirement for Granules in Limited Class

1{CollectionDescriptionClass}1+
0{ECSDataGranule}1+
0{StorageMediumClass}n+
0{UserCommentDocument}1+
0{SpatialDomainContainer}1+
0{[RangeDateTime|SingleDateTime]}1+
0{ProcessingQA}n+
0{AnalysisSource }n+
0{Campaign}n+
0{InputGranule}n+
0{Platform } +
 0{Instrument } +
 0{OperationModeClass}1 +
 0{Sensor}+
 0{SensorCharacteristic+SensorCharacteristicValueClass}n }n }n+
0{QAGranule}n+
0{AdditionalAttributes } +
 1{InformationContent } +
 0{QAFlags}1 }1 }n+
0{Browse}n+
0{PGEVersionClass}1+
0{ProcessingHistory}1+
0{OrbitParametersGranule}n+
 0{OrbitCalculatedSpatialDomain}1 }n+
0{AncillaryInputGranule}n+
0{QAStats}1+
0{Review}n+

2.5.2 Metadata Requirement for Granules in Intermediate Class

1{CollectionDescriptionClass}1+
1{ECSDataGranule}1+
1{SpatialDomainContainer}1+
1{[RangeDateTime|SingleDateTime]}1+
0{StorageMediumClass}n+
0{UserCommentDocument}1+
0{ProcessingQA}n+
0{AnalysisSource}n+
0{Campaign}n+
0{InputGranule}n+
0{Platform+
 0{Instrument +
 0{OperationModeClass}1 +
 0{Sensor+
 0{SensorCharacteristic+SensorCharacteristicValueClass}n }n }n+
0{QAGranule}n+
0{AdditionalAttributes +
 1{InformationContent +
 0{QAFlags}1 }1 }n+
0{Browse}n+
0{PGEVersionClass}1+
0{ProcessingHistory}1+
0{OrbitParametersGranule}n+
0{OrbitCalculatedSpatialDomain}1+
0{AncillaryInputGranule}n+
0{QAStats}1+
0{Review}n+

2.5.3 Metadata Requirement for Granules in Full Class

For granules in the full class, a significant suite of attributes are required. Services available related to these metadata are search on time and space using whatever space measurement is provided. All client end searches are translated in the Data Server Subsystem to the spatial data type appropriate to the collection. Search and retrieval of production history, browse, QA files, orbit parameter files, inputs and ancillary inputs are all allowed. Interrogation of inventoried QA measures and reprocessing status is allowed. Pointers provide navigation out of the database into archive data objects.

```
1{ECSDataGranule}1+
1{CollectionDescriptionClass}1+
1{InputGranule}n+
1{QAStats}1+
1{SpatialDomainContainer}1+
1{[RangeDateTime|SingleDateTime]}1+
1{ProcessingHistory}1+
1{PGEVersionClass}1+
0{AncillaryInputGranule}n+
0{Review}n+
0{ProcessingQA}n+
0{AdditionalAttributes +
    1{InformationContent +
        0{QAFlags}1}1}n+
0{Browse}n+
0{OrbitParametersGranule +
    0{OrbitCalculatedSpatialDomain}1}n+
0{StorageMediumClass}n+
0{UserCommentDocument}1+
0{AnalysisSource}n+
0{Campaign}n+
0{Platform +
    0{Instrument +
        0{OperationModeClass}1 +
        0{Sensor+
            0{SensorCharacteristic+SensorCharacteristicValueClass}n}n}n}n+
0{QAGranule}n+
```

2.5.4 Metadata Requirement for Browse Products

Browse granules are assumed to be produced alongside regular product granules. The attribute set required for browse products are not distinguished between product categories.

granule metadata (browse) =

This set is mandatory

Shortname +
VersionID+
GranulePointer+

This set is optional

BrowseDescription +
BrowseSize

Hence the following will be available in the inventory and accessible with the browse:

GranulePointer
BrowsePointer

2.6 Compound Definitions

The following are BNF definitions of the boldface classes referenced in sections 2.4 and 2.5. Classes are grouped as Granule/Collection, Spatial, Temporal, Document, Contact and Delivered AlgorithmPackage.

Granule/Collection

AdditionalAttributes = AdditionalAttributeDatatype + AdditionalAttributeDescription + AdditionalAttributeName

AlgorithmDescription = See Delivered Algorithm Package

AltitudeResolutionClass = AltitudeResolution

AltitudeSystemDefinition= See Spatial

AnalysisSource = AnalysisShortName + AnalysisLongName + AnalysisTechnique +AnalysisType

(Associated with AnalysisSourceGuide)

AnalysisSourceGuide = See Document

AncillaryInputGranule = AncillaryInputType +AncillaryInputPointer

ArchiveCenterGuide = See Document

ATBD = See Delivered Algorithm Package

Author= See Document

BoundingRectangle = See Spatial

Browse = BrowsePointer +BrowseDescription + BrowseSize

CalibrationFiles= See Delivered Algorithm Package

Campaign = CampaignShortName + (CampaignLongName) + (CampaignStartDate) + (CampaignEndDate)

CampaignGuide = See [Document](#)

ChangeLog = See [Delivered Algorithm Package](#)

Circle = See [Spatial](#)

CollectionAssociation = CollectionType + CollectionUse

CollectionDescriptionClass = ShortName +(LongName) + (CollectionDescription) + VersionID

CompileInfo= See [Delivered Algorithm Package](#)

Contact = See [Contact](#)

ContactAddress = See [Contact](#)

ContactOrganization = See [Contact](#)

ContactPerson = See [Contact](#)

ContextDiagrams= See [Delivered Algorithm Package](#)

CoordinateRepresentation = See [Spatial](#)

CSDTDescription = PrimaryCSDT + IndirectReference +Implementation +CSDTComments

DeliveredAlgorithmPackage = See [Delivered Algorithm Package](#)

DeliveryContentsList = See [Delivered Algorithm Package](#)

DepthResolutionClass = DepthResolution

DetailedDesign = See [Delivered Algorithm Package](#)

DistanceandBearingRepresentation = See [Spatial](#)

Document = See [Document](#)

ECSCollection = (RevisionDate) + (SuggestedUsage) + ProcessingCenter + ArchiveCenter

ECSCollectionGuide = See [Document](#)

ECSDataGranule = SizeMBECSDataGranule + ReprocessingPlanned + ReprocessingActual + GranulePointer +(LocalGranuleID) + (DayNightFlag) + ProductionDateTime + (LocalVersionID)

ECSDiscipline = ECSDisciplineKeyword

ECSPARAMETER = ECSPARAMETERKeyword

ECSTerm = ECSTermKeyword

ECSTopic = ECSTopicKeyword

ECSVariable = ECSVariableKeyword

Email = See [Contact](#)

ExternalData = See [Delivered Algorithm Package](#)

GeodeticModel = See [Spatial](#)

GeographicCoordinateSystem = See [Spatial](#)

GridCoordinateSystem = See [Spatial](#)

Gring = See [Spatial](#)

GringPoint = See [Spatial](#)

Guide = See [Document](#)

InformationContent = ParameterValue

InputGranule = InputPointer

Instrument = InstrumentShortName + (InstrumentLongName) +(InstrumentTechnique) + (NumberofSensors)

InstrumentCharacteristic = InstrumentCharacteristicName + (InstrumentCharacteristicUnit) + (InstrumentCharacteristicDescription) + (InstrumentCharacteristicDataType)

InstrumentCharacteristicValueClass = InstrumentCharacteristicValue

InstrumentEngineeringData - See [Delivered Algorithm Package](#)

InstrumentGuide = See [Document](#)

InstrumentScienceData = See [Delivered Algorithm Package](#)

JournalArticle = See [Document](#)

KeywordClass = TemporalKeyword + SpatialKeyword

LinkandCompileScripts = See [Delivered Algorithm Package](#)

LocalCoordinateSystem = See [Spatial](#)

Locality = LocalityType + LocalityDescription

LocalPlanarCoordinateSystem = See [Spatial](#)

MapProjection = See [Spatial](#)

MetaDataConfigurationFile = See [Delivered Algorithm Package](#)

MultipleDataTimePeriod = See [Temporal](#)

MultipleTypeCollection = AggregationValue + AggregationRelationship + AggregationType

OperationModeClass = OperationMode

OperationsManual = See [Delivered Algorithm Package](#)

OrbitCalculatedSpatialDomain = Orbit modelName + OrbitNumber + StartOrbitNumber + StopOrbitNumber + EquatorCrossingLongitude + EquatorCrossingTime + EquatorCrossingDate

OrbitParametersGranule = OrbitParametersPointer

PerformanceTestResults = See [Delivered Algorithm Package](#)

PGEConfigFile = See [Delivered Algorithm Package](#)

PGEDescription = See [Delivered Algorithm Package](#)

PGEErrorLog = See [Delivered Algorithm Package](#)

PGEExecutable = SCSWExecutablesPointer

PGEInfo = See [Delivered Algorithm Package](#)

PGEVersionClass = PGEVersion

PhysicalParameterDetails = ParameterUnitsofMeasurement + ParameterRange + ParameterValueAccuracy + ParameterValueAccuracyExplanation + ParameterMeasurementResolution

PlanarCoordinateSystemInformation = See [Spatial](#)

Platform = PlatformShortName + PlatformLongName + PlatformType

PlatformAncillaryData = See [Delivered Algorithm Package](#)

PlatformCharacteristic = PlatformCharacteristicDescription +
PlatformCharacteristicDataType+ PlarformCharacteristicName + PlatformCharacteristicUnit

PlatformCharacteristicValueClass = PlatformCharacteristicValue

PlatformGuide = See [Document](#)

Point = See [Spatial](#)

ProcessControlParametersandResourceFiles = See [Delivered Algorithm Package](#)

ProcessingCenterGuide = See [Document](#)

ProcessingDependencies = See [Delivered Algorithm Package](#)

Processing ErrorReport= See [Document](#)

ProcessingFileDescription = See [Delivered Algorithm Package](#)

ProcessingHistory =ProcessingHistoryPointer

ProcessingLevel = ProcessingLevelDescription + ProcessingLevelID

ProcessingQA =ProcessingQADescription + ProcessingQAAttribute

ProcessingReport = See [Document](#)

ProcessingResourceUsageReport= See [Document](#)

ProcessingStatusReport = See [Document](#)

ProductionPlan = See [Document](#)

ProgrammersGuide = See [Delivered Algorithm Package](#)

QAFlags = QualityFlagExplanation +
[AutomaticQualityFlag|OperationalQualityFlag|ScienceQualityFlag]

QAGranule = QAGranulePointer

QAStats = (QAPercentInterpolatedData) + QAPercentMissingData+
(QAPercentOutofBoundsData)+ (QAPercentCloudCover)

QualityTextComment = QualityTextCommentPointer

RangeDateTime = See [Temporal](#)

ReferencePaper = See [Document](#)

RegionalAreaDefinitionGuide = See [Document](#)

RegularPeriodic = See [Temporal](#)

ResultsProductFile = See [Delivered Algorithm Package](#)

ResultsReport = See [Delivered Algorithm Package](#)

Review = ScienceReviewDate + ScienceReviewStatus + FutureReviewDate

ScSWScript = See [Delivered Algorithm Package](#)

SCSWSourceCode = See [Delivered Algorithm Package](#)

Sensor = SensorShortName + SensorLongName + SensorTechnique

SensorCharacteristic = SensorCharacteristicName + (SensorCharacteristicDescription) +
(SensorCharacteristicDataType) + (SensorCharacteristicUnit)

SensorCharacteristicValueClass = SensorCharacteristicValue

SensorGuide = See [Document](#)

SingleDateTime = See [Temporal](#)

SingleTypeCollection = (CitationforExternalPublication) + CollectionState + MaintenanceandUpdateFrequency + (AccessConstraints)

Software = See [Delivered Algorithm Package](#)

Spatial = See [Spatial](#)

StandAloneDocumentPointer = See [Document](#)

StorageMediumClass = StorageMedium

SWDevelopmentSandard = See [Delivered Algorithm Package](#)

SystemDescription = See [Delivered Algorithm Package](#)

Telephone = See [Contact](#)

Temporal = See [Temporal](#)

TestPlan = See [Delivered Algorithm Package](#)

TestSiteConfig = See [Delivered Algorithm Package](#)

TestSourceCode = See [Delivered Algorithm Package](#)

UserCommentDocument = UserCommentDocumentPointer

ValidationDocument = ValidationDocumentPointer

VerticalSpatialDomain = See Spatial

ZoneIdentifierClass = ZoneIdentifier

Temporal

Temporal = TimeType + DateType + TemporalRangeType + PrecisionofSeconds+
EndsAtPresentFlag

RegularPeriodic = PeriodName + Period1stDate + Period1stTime +
PeriodCycleDurationUnit + PeriodCycleDurationValue + PeriodDurationUnit +
PeriodDurationValue

MultipleDateTimePeriod = MultipleDateTimeName + 2{SingleDateTime}n

SingleDateTime = TimeOfDay + CalendarDate

RangeDateTime = RangeBeginningTime + RangeBeginningDate +
RangeEndingTime + RangeEndingDate

Spatial

Spatial = SpatialCoverageType + **SpatialDomainContainer** + **CoordinateSystemContainer**

SpatialDomainContainer = 0{**GranuleLocality**}n + 0{**VerticalSpatialDomain**}n+
1{**HorizontalSpatialDomainContainer**}1

GranuleLocality = LocalityValue

VerticalSpatialDomain = VerticalSpatialDomainValue +
VerticalSpatialDomainType

HorizontalSpatialDomainContainer = 1{**ZoneIdentifierClass**}1+
[**GPolygonContainer|BoundingRectangle|Point|Circle**]

GPolygonContainer = 1{**GRing**} + 3{**GRingPoint**}n

GRing=ExclusionGRingFlag

GRingPoint = GRingPointLatitude + GRingPointLongitude + GRingPointSequenceNo

BoundingRectangle = WestBoundingCoordinate + NorthBoundingCoordinate
+ EastBoundingCoordinate + SouthBoundingCoordinate

Point = PointLatitude + PointLongitude

Circle = CenterLatitude + CenterLongitude + RadiusValue + RadiusUnits

CoordinateSystemContainer = 0{VerticalCoordinateSystemContainer}1 +
0{HorizontalCoordinateSystemContainer}1

VerticalCoordinateSystemContainer = 0{AltitudeSystemDefinition}1 +
0{DepthSystemDefinition}1

AltitudeSystemDefinition = AltitudeDatumName + AltitudeDistanceUnits
+ AltitudeEncodingMethod + 1{AltitudeResolutionClass}1

DepthSystemDefinition = DepthDatumName + DepthDistanceUnits + DepthEncodingMethod +
1{DepthResolutionClass}1

HorizontalCoordinateSystemContainer = 0{GeodeticModel}1 +
[GeographicCoordinateSystem|PlanarCoordinateSystemsContainer|LocalCoordinateSystem]

GeodeticModel = HorizontalDatumName + EllipsoidName + SemiMajorAxis + Denominatorof
FlatteningRatio

GeographicCoordinateSystem = LatitudeResolution + LongitudeResolution
+ GeographicCoordinateUnits

PlanarCoordinateSystemsContainer = 0{PlanarCoordinateSystemContainer}n

PlanarCoordinateSystemContainer = 1{PlanarCoordinateInformation}1 +
[MapProjection|LocalPlanarCoordinateSystem|GridCoordinateSystem]

MapProjection = MapProjectionName + MapProjectionPointer

LocalPlanarCoordinateSystem = LocalPlanarCoordinateSystemDescription +
LocalPlanarGeoreferenceInformation

GridCoordinateSystem = GridCoordinateSystemName

LocalCoordinateSystem = LocalCoordinateSystemDescription + LocalGeoreferenceInformation

PlanarCoordinateInformation = PlanarDistanceUnits + PlanarCoordinateEncodingMethod +
[DistanceandBearingRepresentation|CoordinateRepresentation]

DistanceandBearingRepresentation = DistanceResolution + BearingResolution + BearingUnits
+ BearingReferenceDirection + BearingReferenceMeridian

CoordinateRepresentation = AbcissaResolution + OrdinateResolution

Document

Author = AuthorName

Document = 0{**Author**}n + DocumentCreated + DocumentUpdated + DocumentVersion + Title +
[ProcessingReport|ReferencePaper|Guide|AlgorithmDescription| ProductionPlan]

ProcessingReport = ProcessingReportType + ProcessingReportPeriod +
[ProcessingStatusReport|ProcessingErrorReport| ProcessingResourceUsageReport]

ProcessingStatusReport = ProcessingStatusReportPointer

ProcessingErrorReport = ProcessingErrorReportPointer

ProcessingResourceUsageReport = ProcessingResourceUsageReportPointer

ReferencePaper = DateofReferencePaperPublication + ReferencePaperReference +
ReferencePaperType + AbstractPointer + AccessInstructions +
[StandAloneDocument|JournalArticle]

StandAloneDocument = StandAloneDocumentPointer

JournalArticle = JournalArticlePointer]

Guide = GuideName +DataCenter+

[**ECSCollectionGuide**|**ArchiveCenterGuide**|**ProcessingCenterGuide**
CampaignGuide|**InstrumentGuide** |**AnalysisSourceGuide** |**PlatformGuide**|**SensorGuide**
RegionalAreaDefinitionGuide]

ECSCollectionGuide =ECSCollectionGuidePointer

ArchiveCenterGuide=ArchiveGuidePointer

ProcessingCenterGuide = ProcessingCenterGuidePointer

CampaignGuide= CampaignGuidePointer

InstrumentGuide= InstrumentGuidePointer

AnalysisSourceGuide= AnalysisSourceGuidePointer

PlatformGuide= PlatformGuidePointer

SensorGuide= SensorGuidePointer

RegionalAreaDefinitionGuide=

RegionalAreaDefinitionGuidePointer+GeographicalRegionName

AlgorithmDescription = DescriptionType

ProductionPlan = DAACName +ProductionPlanEndDate+ProductionPlan StartDate +
ProductionPlanForecast + ProductionPlanDescription + PlannedDataSets +
ProductionPlanPointer

Contact

Contact = Role + (HoursofService) + ContactInstructions +
[ContactPerson | ContactOrganization] +0{Email}n + 0{ContactAddress}n +0{Telephone}n

ContactPerson = ContactJobPosition + ContactFirstName + ContactMiddleName +
ContactLastName

ContactOrganization = ContactOrganizationName

Email = ElectronicMailAddress

Telephone = TelephoneNumber + TelephoneNumberType

ContactAddress = StreetAddress + City + StateProvince + PostalCode + Country

Delivered Algorithm Package

DeliveredAlgorithmPackage = 0{Contact}n + AlgorithmPackageName +
AlgorithmPackageVersion + AlgorithmPackageMaturityCode +
AlgorithmPackageAcceptanceDate + DeliveryPurpose + 1{DeliveryContentsList}1 +
1{AlgorithmDescription}1 +0{ContextDiagrams}1+ 0{ChangeLog}1+ 1{PGEInfo}1

DeliveryContentsList = DeliveryContentsListPointer

AlgorithmDescription= 1{Document}1+ DescriptionType+ 0{SystemDescription}1+
0{SWDevelopmentStandard}1+ 0{ProcessingFileDescription}1+ 0{ProgrammersGuide}1 +
1{ATBD}1 + 0{DetailedDesign}1 + 1{TestPlan}n +0{PerformanceTestResults}1 +
0{OperationsManual}1

SystemDescription = SystemDescripionPointer

SWDevelopmentStandard = SWDevelopmentStandardPointer

ProcessingFileDescription = ProcessingFileDescriptionPointer

ProgrammersGuide = ProgrammersGuidePointer

ATBD=ATBDPointer

DetailedDesign = DetailedDesignPointer

TestPlan = TestPlanPointer

PerformanceTestResults = PerformanceTestResultsPointer

OperationsManual = OperationsManualPointer

ContextDiagrams = ContextDiagramsPointer

ChangeLog = ChangeLogPointer

PGEInfo=DateLastModified+ ReceivedAlgorithmPackagePointer+ 1{**PGEDescription**}1 + 1{**PGEConfigFile**}1+ 1{**TestSiteConfig**}1 + 1{**Software**}1 + 0{**PGEErrorLog**}1 + 1{**ProcessingDependencies**}1

PGEDescription=0{**PGEVersionClass**}n +PGEName +PGEFunction + PGEIdentifier

PGEVersionClass = PGEVersion + 1{**PGEExecutable**}1 + 1{**CompileInfo**}1 + 1{**ProcessingResourceUsageReports**}1

CompileInfo = CompileInfoPointer

PGEExecutable = ScSWExecutablesPointer

PGEConfigFile = PGEConfigFilePointer

TestSiteConfig = TestSiteConfigPointer

Software = SWDateLastModified + 1{**ScSWSOURCECODE**}n +1{**ScSWSCRIPT**}n + 1{**LinkandCompileScripts**}n + 1{**TestSWContainer**}n

PGEErrorLog = PGEErrorLogPointer

ProcessingDependencies = ProcessingDependenciesPointer

ScSWSourceCode = SCSWSourceCodePointer

ScSWScript=ScSWScriptPointer

LinkandCompileScripts = LinkandCompileScriptsPointer

TestSWContainer = 1{**TestSourceCode**}1 + 1{**InputContainer**}1 + 1{**TestScript**}1 + 0{**OutputComparisonContainer**}1

TestSourceCode = TestSourceCodePointer

InputContainer = 1{**MetadataConfigurationFile**}1 + 1{**InstrumentScienceData**}1 + 0{**InstrumentEngineeringData**}1 + 0{**PlatformAncillaryData**}1 + 0{**ExternalData**}1 + 0{**CalibrationFiles**}1 + 1{**ProcessControlParametersandResourceFiles**}1

MetadataConfigurationFile= MetadataConfigurationFilePointer

InstrumentScienceData=InstrumentScienceDataPointer

InstrumentEngineeringData=InstrumentEngineeringDataPointer

PlatformAncillaryData=PlatformAncillaryDataPointer

ExternalData=ExternalDataPointer

CalibrationFiles=CalibrationFilesPointer

ProcessControlParametersandResourceFiles=
ProcessControlParametersandResourceFilesPointer

TestScript =TestScriptPointer

OutputComparisonContainer = 0{**ResultsProductFile**}1 + 0{**ResultsReport**}1

ResultsProductFile = ResultsProductFilePointer

ResultsReport= ResultsReportPointer

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